PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P31612-PO	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP 03/12800	International filing date *(day/month/year)* 06.10.2003	Priority date *(day/month/year)* 17.10.2002
International Patent Classification (IPC) or both national classification and IPC G11B7/125		
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
23.04.2004	16.11.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Stemmer, M Telephone No. +49 89 2399-2282

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/JP 03/12800

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-10, 12-32	as originally filed
11	received on 04.10.2004

Claims, Numbers

2-10	as originally filed
1	received on 12.07.2004
11	received on 04.10.2004

Drawings, Sheets

1/5-5/5	as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-11
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-11
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

   see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following document:

   D1: EP-A-0 385 537 (PHILIPS NV) 5 September 1990 (1990-09-05)

2. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document):
   An optical disc drive comprising: a laser light source (L) for emitting a laser beam of which the intensity is changeable with the amount of drive current supplied thereto; a first photodetector (D1-D4), which receives a portion of the laser beam that has been emitted from the laser light source and then reflected from an optical disc (20), thereby generating a readout signal ; a second photodetector (M), which receives another portion of the laser beam that has been emitted from the laser light source, generates an electric signal of which the level represents the power of the laser beam received, and outputs the electric signal as a light quantity detection signal ; and a feedback control loop (40), which compares the level of the light quantity detection signal (MON) with a predetermined target value (MREF) and controls the amount of the drive current so that the level of the light quantity detection signal approaches the target value, wherein, the target value is changed so as to compensate for a variation of the sensitivity of the second photodetector (p 6 l 28-32) , thereby controlling the power of the laser beam emitted from the laser light source (p 4 l 16-49: p 6 l 5-32; fig 1,2,4).

   The subject-matter of claim 1 therefore differs from this known D1 in that:
   the target value is changed when reading data from the optical disc and further said variation of the sensitivity of the second photodetector being detected when a write power optimization is conducted.

   The subject-matter of the present claim 1 provides thus an advantage over the prior art in that the compensation for a variation of the sensitivity of the second photodetector can be conducted during read write operation and not only under manual adjustment respectively the monitor sensitivity determining procedure disclosed in D1 (p 6 l 38-44).

The combination of features of claim 1 is neither disclosed nor rendered obvious by the available prior art.

The subject-matter of present claim 1 could be therefore considered as both novel and inventive (Art 33 (2) and (3) PCT).

This applies mutatis mutandis to claim 11 when replacing the feature "when a write power optimization is conducted" of claim 1 by the corresponding feature of claim 11 : "while writing data to the optical disc".

3. Claims 2-10 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Additional remarks

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

2. Independent claims 1 and 11 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

3. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

4. Claim 11 contains the following feature "decreasing the target value as the sensitivity of the second photodetector decreases; and regulating the amount of the drive current such that the level of the light quantity detection signal approaches the decreased target value while reading the data from the optical disc" which appears to correspond by its scope to the following feature of claim 1 "in reading data from the optical disc, the target value is changed so as to compensate for a variation of the sensitivity of the second photodetector".

To reinforce unity the same terms designating the same features should be used.

drive current supplied thereto. The first photodetector preferably receives a portion of the laser beam that has been emitted from the laser light source and then reflected from an optical disc, thereby generating a readout signal. The second photodetector preferably receives another portion of the laser beam that has been emitted from the laser light source, generates an electric signal of which the level represents the power of the laser beam received, and outputs the electric signal as a light quantity detection signal. The feedback control loop preferably compares the level of the light quantity detection signal with a predetermined target value and preferably controls the amount of the drive current so that the level of the light quantity detection signal approaches the target value. The driving method preferably includes the steps of: sensing a decrease in the sensitivity of the second photodetector while reading data from the optical disc; decreasing the target value as the sensitivity of the second photodetector decreases ; and regulating the amount of the drive current such that the level of the light quantity detection signal approaches the decreased target value while reading the data from the optical disc, thereby controlling the power of the laser beam emitted from the laser light source.

Other features, elements, processes, steps, characteristics and advantages of the present invention will become more apparent from the following detailed description of preferred embodiments of the present

CLAIMS

1. An optical disc drive comprising:

a laser light source for emitting a laser beam of which the intensity is changeable with the amount of drive current supplied thereto;

a first photodetector, which receives a portion of the laser beam that has been emitted from the laser light source and then reflected from an optical disc, thereby generating a readout signal;

a second photodetector, which receives another portion of the laser beam that has been emitted from the laser light source, generates an electric signal of which the level represents the power of the laser beam received, and outputs the electric signal as a light quantity detection signal; and

a feedback control loop, which compares the level of the light quantity detection signal with a predetermined target value and controls the amount of the drive current so that the level of the light quantity detection signal approaches the target value,

wherein in reading data from the optical disc, the target value is changed so as to compensate for a variation of the sensitivity of the second photodetector, thereby controlling the power of the laser beam emitted from the laser light source.

wherein the corrected target value is used in reading the data from the optical disc.

10. The optical disc drive of claim 9, further comprising:

decision means for obtaining a timer upper limit value using the value stored on the memory element to represent the difference; and

a timer, which keeps counting until its count reaches the timer upper limit value,

wherein when the count of the timer reaches the timer upper limit value, the value stored on the memory element to represent the difference is updated into a new value.

11. A method for driving an optical disc drive that includes a laser light source, a first photodetector, a second photodetector and a feedback control loop, wherein the laser light source emits a laser beam of which the intensity is changeable with the amount of drive current supplied thereto; the first photodetector receives a portion of the laser beam that has been emitted from the laser light source and then reflected from an optical disc, thereby generating a readout signal; the second photodetector receives another portion of the laser beam that has been emitted from the laser light source, generates an electric

signal of which the level represents the power of the laser beam received, and outputs the electric signal as a light quantity detection signal; and the feedback control loop compares the level of the light quantity detection signal with a predetermined target value and controls the amount of the drive current so that the level of the light quantity detection signal approaches the target value,

the method comprising the steps of:

sensing a decrease in the sensitivity of the second photodetector while reading data from the optical disc;

decreasing the target value as the sensitivity of the second photodetector decreases ; and

regulating the amount of the drive current such that the level of the light quantity detection signal approaches the decreased target value while reading the data from the optical disc, thereby controlling the power of the laser beam emitted from the laser light source.